THE DESCRIPTION OF VITAMIN D LEVEL, CALCIUM SERUM, AND MANDIBULAR BONE DENSITY IN HIV/AIDS CHILDREN

Primarti RS*, Riyanti E*, Sufiawati I**, Azhari***

*Deapartment of Pediatric Dentistry, **Oral Medicine, ***Oral Radiology
Faculty of Dentistry, Universitas Padjadjaran

Abstract

Background: Human immunodeficiency virus (HIV) is a virus attacking the immune system of the body, with HIV type 1 as the most prevalent cause. The proportion of women in new HIV infections in Indonesia has grown from 34 percent in 2008 to 44 percent in 2011, which might lead to an increased number of infections among children. There is an association between low vitamin D and HIV disease progression. Vitamin D is not only involved in calcium homeostasis which has a negative impact on bone health, but it also plays role in regulation of immune system. Bone alteration have been observed in the course of HIV with reduced bone mineral density as the common bone lesion found in HIV patients. Bone mineral density is a parameter that predict fracture risk which in turn correlates with a shorter life expectancy. This research studied the vitamin D level, calcium serum and cortical mandibular bone density in HIV/AIDS children.

Method: The research method is cross sectional study, serum 1, 25-dihydroxyvitamin D and calcium levels were assessed from blood of randomly selected subjects of HIV infected children, enrolled treatment at Klinik Teratai FKUP Rumah Sakit Hasan Sadikin Bandung, West Java, Indonesia during March-June 2015. Panoramic radiograph were taken for measuring cortical mandibular bone density.

Result: All 40 HIV/AIDS children subjects showed the number of 1,25-dihydroxyvitamin D serum classified as vitamin D deficient (≤ 20nm/ml). A few subjects showed an insufficient calcium level serum. Bone quality measurement result showed that 30% of the patients had normal bone, 50% experienced osteopenia, and 20% showed a tendency of osteoporosis.

Conclusion: It may be concluded that most of children with HIV/AIDS were vitamin D deficient and only few patients experienced depressed calcium in blood. As many as 75% of all patients showed osteopenia of the mandibular cortex bone.

Background

Human immunodeficiency virus (HIV) is a virus causing acquired immunodeficiency syndrome (AIDS). Increase the number of HIV infected children is passed from infected mothers to their children through vertical transmission(1). The proportion of women in new HIV infections in Indonesia has grown from 34% in 2008 to 44% in 2011 which lead to an increase number of infections among children. The use of highly active antiretroviral therapy (HAART) has been dramatically decreased the incidence and mortality rate related to opportunistic infections that occurred due to the low immune system. According to several studies, the relationship between antiretroviral therapy (ART) and vitamin D deficiency and low bone density in infected patients. (2,3).

Research Method

This was a cross sectional study. Research populations were HIV/AIDS- infected children below 15 years old of age, enrolled treatment in Klinik Rawat Jalan Teratai FKUP - RS. Dr. Hasan Sadikin Bandung. Samples were taken using consecutive sampling method, which means all samples who met the criteria were included in the study. Inclusive criteria:

1) HIV/AIDS-infected children enrolled treatment in Klinik Teratai FKUP-RS Dr. Hasan Sadikin Bandung.
2) HIV/AIDS patients receiving HAART for more than 1 year.
3) Male or Female patients aged below 15 years old.

Blood Handling

As much as 6 ml of blood was drawn in order to test vitamin D, and calcium level. Calcium level was assessed using O-Cresol Phtalen method, meanwhile Vitamin D level was examined using Chemiluminescent method.

Mandibular cortical bone density

Mental region cortical bone of the mandible were morphometrically classified into three category:

1) C1: Endosteal margin of the mandibular cortex were even and smooth on both left and right side.
2) C2: Endosteal margin showed a semilunar defect (lacunarresorption) or formed an endosteal residue (1 up to 3 layers) on one or both sides.
3) C3: Endosteal margin formed many cortical layer endosteal residue and formed porosity.

Result

Calcium

Vitamin D 25 – OH

Vitamins D 25 – OH

Reserch was shown that HIV infected patient's with low 1,25(OH)2D3 had blocked PTH production despite the normal calcitonin level in blood. PTH elevated the calcium absorption that trigger RANKL expressions in the osteoblasts and stimulated osteoclas maturation. Teichman conducted a study about osteopaenia in HIV infected females receiving HAART especially those with protease inhibting character. This study found out that bone formation velocity marker was related to bone resorption that was marked by calcium excretion elevation. The lower 1,25 (OH)2D3level was also contributed to calcium level imbalance and inhibition of bone formation.

Conclusion

It may be concluded that most of children with HIV/AIDS were vitamin D deficient and only few patients experienced depressed calcium in blood. As many as 75% of all patients showed osteopenia of the mandibular cortex bone.

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